

480542

AET Environmental Programs Manual

MATERIALS MANAGEMENT PLAN

PROJECT NO. 98-065

NORTHSIDE TREATMENT PLANT PARK

DENVER, COLORADO

June 1999

For

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ADMINISTRATIVE RECORD

12 (2)

INTRODUCTION

This Material Management Plan, (MMP), establishes policies and procedures for the excavation and storage of waste materials which may be encountered at the Northside Treatment Plant Park Project 98-065 as specified in Section 250 . The guidance provided is applicable to AET employees and contractors at all levels who in any way participate in the development and execution of AET actions involving the handling, excavation, storage, transportation, and/or disposal of soils or materials. It sets forth guidelines to ensure that such operations do not result in solid or hazardous wastes being disposed of improperly and to ensure that areas of contamination are promptly addressed in order to protect the site workers, general public, and the environment .

POLICY

It is AET Policy To:

- **Evaluate the need for analysis on all soils prior to excavation;**
- **Minimize the volume and toxicity of waste soil generated by onsite operations to the extent technically, and legally possible and economically practicable;**
- **Reuse clean soil as fill material whenever possible;**
- **Fulfill the requirements of landfills disposal parameters.**

OVERVIEW:

This MMP is based in part on information presented in the following documents:

Phase II Environmental Site Assessment of September 11, 1995 by Pinyon Environmental Engineering Resources, Inc.

Phase II Soil Capping Design Northside Treatment Plant, Community Soils Remediation ASARCO Inc. October 1997.

Analytical Results for Goodson & Associates by Quanterra Inc. October 1998

Photograph and location diagram of buried pipe with possible asbestos by Wenk Associates 1998

ASARCO Inc. Test Results for 5201 Franklin Street Denver, CO Community Soils Remediation 1995

The MMP establishes specific concentration ranges for contaminants in soil and waste

materials, and identifies acceptable onsite uses for contaminated soils and waste materials within these concentration ranges.

Procedures for identifying contaminated soils and waste materials through initial screening and analytical testing are set forth, including training of site workers to enhance their ability to identify possible areas of concern during site activities.

The MMP is consistent with the site-specific HASP and will be implemented in conjunction with the HASP.

The MMP specifies that a qualified Monitoring Technician (MT) will be present on site to assure compliance with the MMP and HASP during any excavation or handling activities which involve or have reasonable possibility of involving any hazardous materials, soils, or debris. Particularly during the excavation in the area of the "buried pipe".

As in the HASP a field log will be required and maintained.

The MMP and HASP as well as all work on the site is to conform to the specifications in SECTION 250 12/14/98 of the Bid Form Package for Project 98-4065.

EXISTING SITE CONDITIONS

The site is a closed and partially cleared and remediated waste water treatment plant unused since 1993. Between 1993 and the present numerous environmental studies have been done on the property by the City and County of Denver, (CCD), and ASARCO, Inc. The area has undergone many changes including removal of most of the original structures, regrading and filling of much of the surface area as well as dumping/storage of construction debris, street sweepings, river dredging spoils, unauthorized dumping, and other activities.

Previous studies and remedial actions have resulted in what is believed by the City and County of Denver to be a clean site with the only expected areas of concern to be the areas stated above, as well as the recent (last few months) unauthorized dumping. However as in any project of this nature the unexpected can occur, and vigilance on the part of the site workers will be necessary at all times.

All areas of concern identified by ASARCO have to our knowledge, and as represented by the City and County of Denver, been remediated including areas 146 and 147 mentioned in Section 250 as being of concern. These areas are now being represented as having been remediated.

Other environmental studies found a buried pipe, (location see Figure 1), with possible asbestos contamination in the pipe wrapping material and particular care will be taken when excavating the pipe to avoid any mechanical disturbance of the pipe until the City and County of Denver has sampled and determined it to be non-contaminated. In the event of a finding of asbestos contamination the HSO shall be contacted and at the direction of the HSO proper handling technique and air monitoring will be used to protect the health and safety of the onsite workers, the public and the environment.

Thus although previous studies indicate safe levels of hazardous substances, (with the exceptions noted), the possibility exists that due to the nature of the past events at the property, areas of concern could have been missed. All non native soils will be observed for signs of contamination throughout the project.

SCREENING FOR CONTAMINATION

The most important screening method for this site in areas other than those previously identified above is the observatory powers of the site workers.

The site workers will be instructed in a pre construction meeting at the start of the job to be aware and on the lookout for possible contamination as follows:

Petroleum contamination usually is noted by its appearance and odor: light brown to dark brown, oily, and a strong petroleum odor.

Asbestos containing materials by the non native appearance of the debris, pipe wrappings, tiles either ceiling or flooring and other coated building materials.

Lead, cadmium, or arsenic in paint. All painted materials are suspect.

Chromium as plating of metals or other materials.

Arsenic, lead, cadmium or zinc in soils are not observable except by their poisonous actions on animals or plants. Therefore these contaminants will be tested for if suspected from previous studies or other indications such as non native soils.

Volatile organic materials by odor or PID readings. PID readings of more than 2 times background are subject to further investigation. Areas with PID readings of more than 10 times background shall be evacuated and the HSO immediately contacted. High concentration of volatile compounds pose a risk of fire or explosion and inhalation risks for the workers.

Some of the additional types of potentially hazardous waste that can be visually identified include:

- Automobile storage batteries
- Transformers
- Containers of liquids
- Containers that are smoking, bubbling, or giving off noxious odors
- Waste materials that are oily or contain free liquids

If any of these types of potentially hazardous materials are found, work stops until a hazard assessment is performed, and the hazard has been properly neutralized.

If any hazardous materials are suspected for any reason testing of the soils or debris will be done prior to excavation or immediately after excavation on the stockpiled spoils. See Soil Management Guidelines.

Any sampling will be in conjunction with Denver Environmental/Health Services, (DEH/EVS), and monitored by the HSO or designate, and the generator of any waste will be the City and County of Denver.

Testing will be determined by the HSO or designate with the direction from DEH/EVS based on the suspected contaminate(s) from the observations above.

SOIL MANAGEMENT GUIDELINES

Prior to excavation of suspected contaminated areas:

A 50 by 50 foot grid shall be marked on the surface

Hollow stem auger or back hoe sampling of each point on the grid will be done and the samples analyzed for the suspected contaminate

Samples shall be obtained at intervals as determined to delineate the extent of contamination, usually each 2-3 feet.

Sampling and decontamination will be consistent with good technique, stainless steel sampling equipment, decontaminated as necessary for the contaminate suspected. Containerized, stored, shipped, and analyzed consistent with the suspected contaminate.

All sampling will be supervised by the HSO or designate and at the direction of the DEH/EVS.

Stockpiled material will be divided, stored, labeled as to location, depth, time and

date, in 50 yard piles. Each pile will be sampled by combining 4 pseudo random samples from each pile at the direction of the HSO. The location of each sample will be marked on the pile and all information noted in the field log.

After determination of the extent of the hazardous nature of the excavated material each pile will be labeled as to the results and as to the disposition of the material, hazardous disposal, landfill, onsite use, etc at the direction of DEH/EVS.

Samples will be containerized and stored as in Table 3 and Table 4. A chain of custody will be generated for each sample, (Figure 2). The CCD will be the generator of any waste.

EQUIPMENT

All equipment necessary for the sampling, excavation, storage, or remediation will be made available as necessary. In the event that hazardous materials are handled the equipment used will be decontaminated in a designated area with proper containment, and with measures to protect the worker's health and protect the environment from any contamination. The decontamination procedure will be determined based on the type of hazardous materials encountered, at the direction of the HSO or designate, with the guidance of the DEH/EVS.

The workers will wear PPE consistent with the contaminate(s).

RECOMMENDED ANALYTICAL METHODS

TCLP methods will be as in SW-846 Test methods for Evaluating Solid Waste. Soil testing for total Arsenic and Lead, USEPA method 7061 and 6010 with TCLP for metals 1311.

SOIL MANAGEMENT GUIDELINES PROPOSED

The following guidelines will be used to determine the disposition of any excavated waste materials or suspected waste materials to be used onsite:

If the material is soil and to be used with no cover it must conform to the Unrestricted Residential Use Standards in:

Proposed Soil Remediation Objectives as developed by the Colorado Hazardous Materials and Waste Management Division (see Table 1.)

If the material is soil and will be covered with a minimum of 6 inches of clean soil and

not in contact with ground water it must conform to the following:

Draft Guidelines for Onsite Reuse of contaminated Soil in Non-Residential Areas covered with 6 inches of clean soil and not placed in contact with ground water as presented by CDPHE (see Table 2.)

If the excavated material is not soil or does not conform to either of the above conditions then it must be disposed of off site as directed by DEH/EVS.

SOIL AND DEBRIS: STOCKPILING /STORAGE

Clean excavated soil or other natural substrate material may be stored in stock piles onsite or placed in other locations as agreed upon. Provisions to prevent erosion of storage piles and subsequent water pollution are the responsibility of Goodland Construction.

Typically stockpiles of waste materials shall be stored on a surface such as concrete or an impermeable liner, (polyethylene of 6-12 mil), of appropriate thickness or stored within a building and properly labeled with information including the date, the excavation location, etc. At a minimum, the staging area for the stockpiles shall be constructed to prevent surface water and precipitation from entering the area and to collect any leachate. All soils stockpiles shall remain covered to prevent the generation of dust and appropriate measures shall be taken to prevent dust.

If Staging piles are necessary or created as defined in 40 CFR 264.554 then approval of the design and location of the pile(s) by the CDPH and EPA will be necessary. This designation of Staging Piles is normally for remediation of a site and is not expected to be necessary on this project.

For the safety and ease of identification the identified and possible hazardous materials will be flagged as in Table 5.

HAZARDOUS WASTE

The potential exists that materials which may be classified as hazardous wastes will be encountered on this project. If stockpiled materials are identified as hazardous wastes, the materials will be containerized in drums or in roll-off bins and covered immediately to prevent personal exposure to these materials and to prevent contamination of other materials or the environment. The hazardous waste shall be labeled, DEH/EVS will be notified immediately,

Then at the direction of DEH/EVS provisions should be made as quickly as possible for having the material approved for disposal at an approved hazardous waste disposal facility. These wastes will then be manifested and transported to the disposal

facility designated by DEH/EVS in accordance with all state and federal regulations by appropriately licensed, certified, and insured transporters.

Other security/safety measures such as fencing, caution taping, etc. may be deemed necessary by the HSO or DEH/EVS and will be implemented.

PETROLEUM PRODUCTS

If the site is determined to be contaminated with petroleum products, whether or not the petroleum contamination is associated with an underground storage tank (UST), the contractor is required to contact DEH/EVS immediately. No further work is to be performed in the area associated with the petroleum contaminated soils unless directed in writing by DEH/EVS. Should the contractor discover a UST onsite, DEH/EVS will be contacted immediately and will take over the management of that UST and its associated contaminated soils under Executive Order 109. The contractor will not disturb the UST or its associated soils unless directed to do so by DEH/EVS in writing.

LANDFILL MATERIALS

If in the course of the project landfill materials are required to be removed, these materials must be handled as waste with different actions required depending on the nature of the materials. Importantly care must be taken to protect the health and safety of the workers and the protection of the environment.

In most cases the excavated materials are to be considered waste and must be moved to another landfill. If only construction debris, concrete, dirt, and asphalt are encountered they may be reused if clean. But typically all materials must be tested to determine the nature of the waste.

SOIL DISPOSAL

Where the soils exhibit no more than background levels of contaminants, the excavated soil may be reused for fill on site. Additionally, clean soil may be used off site at landfills as cover material. This activity must be closely coordinated with AET to ensure regulatory requirements are followed. Where it has been shown that there is some contamination, but not enough for the soils to be considered a hazardous waste, the soils will be disposed of as solid waste or managed on site (see Soil Management). Soil which has been determined to be hazardous shall be handled as hazardous waste and disposed of as required by law.

GENERAL GUIDELINES

- Have environmental site assessment analyses performed, as required, for all construction operations early in the planning phase.
- Coordinate all projects requiring site assessment analyses with the Health and Safety Officer.
- For emergency or unplanned projects requiring excavation, contact the HSO for guidance and recommendations concerning the appropriate environmental requirements.
- Arrange for the disposal of excavated soil as recommended.
- Ensure that all sub-contractors under their control fill out hazardous and solid waste manifests with coordination and guidance from HSO and AET and DEH/EVS.

DEFINITIONS

Clean fill

Soil that has been analyzed and found to be free of contamination above natural occurring background concentrations and that is to be reused at the job site or other locations or off site.. Usage must be coordinated with Goodland Construction and AET.

Solid waste

Soil that has been analyzed and found to be free of hazardous contaminants or other nonhazardous contaminants above natural occurring background concentrations, but that is not reused on site. Solid waste must be disposed of at a permitted solid waste landfill.

Hazardous soil

Soil that upon analysis is found to contain hazardous contaminants as defined in 40 CFR 261.3. Such soil must be disposed of at a hazardous waste landfill or as appropriated to be in compliance with all local, state, and federal regulations.

Remediated Soils

Remediated soils will include any on-site materials which will be left on-site and managed according to the guidelines in Tables 1, 2, or at the direction of DEH/EVS.

REGULATIONS AND REQUIREMENTS

The following regulatory documents and AET guidance documents are to be followed:
40 Code of Federal Regulation (CFR) 243 - (as amended) Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste
40 CFR 260, 263 - (as amended) Hazardous Waste Management System

Colorado Department of Public Health and Environment, Hazardous Materials and Waste Management Division

Table 1 Soil Cleanup Table Value Standards (mg/kg)

Chemical	CAS	Residential/ Unrestricted Landuse		Commercial Landuse		Industrial Landuse		Soil Concentration Protective of Ground water		Leachate Reference Concentration	
		[mg/kg]	Notes	[mg/kg]	Notes	[mg/kg]	Notes	[mg/kg]	Notes	[mg/l]	Notes
Pesticides / PCBs											
DDT	50-29-3	0.58	c	2.53	c	2.20	c	1,000	5	NA	
Dieldrin	60-57-1	0.01	c	0.04	c	0.03	c	1,000	5	NA	
PCBs	1336-16-3	0.07	c	0.30	c	0.27	c	1,000	5	NA	
- Aroclor 1016	126-74-112	2.99	nc	19.69	nc	17.31	nc	1,000	5	NA	
- Aroclor 1254	110-97-691	0.63	nc	3.39	nc	3.13	nc	1,000	5	NA	
Metals and Inorganic Compounds											
Arsenic	7440-38-2	0.21	c	1.04	c	0.82	c	NA		1.1	
Cadmium and compounds	7440-43-9	99.5	nc	1052.46	nc	694.46	nc	NA		0.11	
Chromium (VI)	7440-47-3	53.94	nc	212.92	nc	208.57	nc	NA		2.2	1
Copper and compounds	7440-50-8	2,570	nc	41,502	nc	27,537	nc	NA		22	
Lead	7439-92-1	400	nc,3	2,920	nc,4	1,460	nc,4	NA		1.1	
Mercury (inorganic)	7439-97-6	17.66	nc	176.53	nc	137.07	nc	NA		0.044	

NOTES:

c - Standard based on carcinogenic risk.

nc - Standard based on noncarcinogenic risk.

NA - Not Applicable: use of this table to select soil remediation objectives under Tier 2 does not allow for the calculation of a soil concentration under this column.

1. For total chromium

2. Not to exceed the RCRA Characteristic of Toxicity regulatory limit.

3. EPA, July 14, 1994 "Revised Interim Soil Lead Guidance for CERCLA Site and RCRA Corrective Action Facilities," OSWER Directive 935.4-12.

4. Attachment 3

5. Upper Concentration Limit

Colorado Department of Public Health and Environment, Hazardous Materials and Waste Management Division
Table 1 Soil Cleanup Table Value Standards [mg/kg]

Chemical	CAS	Residential/ Unrestricted Landuse		Commercial Landuse		Industrial Landuse		Soil Concentration Protective of Ground water		Leachate Reference Concentration	
		[mg/kg]	Notes	[mg/kg]	Notes	[mg/kg]	Notes	[mg/kg]	Notes	[mg/l]	Notes
Volatile Organic Compounds											
Benzene	71-43-2	0.60	c	3.59	c	2.42	c	0.17		NA	
Carbon Tetrachloride	56-23-25	0.23	c	1.34	c	0.93	c	0.925		NA	
1,1-Dichloroethane	75-34-3	546.80	nc	1,000	5,nc	1,000	5,nc	16.5		NA	
1,1-Dichloroethylene	75-35-4	0.05	c	0.27	c	0.19	c	12.0		NA	
Ethylbenzene	100-41-4	1,000	5,nc	1,000	5,nc	1,000	5,nc	104.3		NA	
Pentachlorophenol	87-86-5	0.51	c	1.95	c	1.87	c	0.045		NA	
Tetrachloroethylene	127-18-4	2.02	c	8.97	c	7.68	c	1.875		NA	
Toluene	108-88-3	667.85	nc	1,000	5,nc	1,000	5,nc	85		NA	
1,1,1-Trichloroethane	71-55-6	797.19	nc	1,000	5,nc	1,000	5,nc	62.5		NA	
Trichloroethylene	79-01-6	2.99	c	16.84	c	11.96	c	0.675		NA	
Vinyl chloride	75-01-4	0.02	c	0.10	c	0.07	c	7.0		NA	
Semi-Volatile Organic Compounds											
Naphthalene	91-20-3	289.1	nc	1,000	5,nc	1,000	5,nc	51.4		NA	
Phenol	108-95-2	1,000	5,nc	1,000	5,nc	1,000	5,nc	23.675		NA	
Xylene (total)	1330-20-7	1,000	5,nc	1,000	5,nc	1,000	5,nc	1,000	5	NA	

Table 2
CDPHE Draft Proposal
Limits for Onsite Reuse of Contaminated Soil in Non-Residential Areas
(Note: contaminated soil may not be placed in contact with ground water or surface water and be covered with a minimum of 6 inches of clean soil)

Constituent	Onsite Reuse Max. mg/kg
Total VOCs	20
Total SVOCs	20
Total BTEX	20
TVPH (gasoline)	100
TPH	100
TEPH(diesel)	250
Oil & Grease	500
PCBs	1
Arsenic	70
Barium	1000
Cadmium	73
Chromium	70
Lead	400
Mercury	15
Selenium	10
Silver	50
Zinc	500

Table 3
Soil and Sludge Sampling Specifications

PARAMETER	CONTAINER	SAMPLE PRESERVATION	HOLDING TIME
VOLATILE ORGANIC	TWO 40 ml Glass VOA Vials NO HEADSPACE	ICE TO 4 C	ANALYZE In 7 Days < 24 Hours on Site
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	1.8 oz Glass Wide-Mouth Bottle	ICE TO 4 C	EXTRACT 14 days ANALYZE In 40 Days
ACID/BASE NEUTRAL EXTRACTABLES	1.8 oz Amber Glass Wide-Mouth Bottle	ICE TO 4 C	EXTRACT In 30 Days
TOTAL RECOVERABLE METALS	1.8 oz Glass Wide-Mouth Bottle		30 Days
RADIOACTIVITY	1.8 oz Glass Wide-Mouth Bottle	Ice to 4 C	None Specified

All Containers must have Teflon-lined lids.

AET

Table 4
Groundwater Sampling Specifications

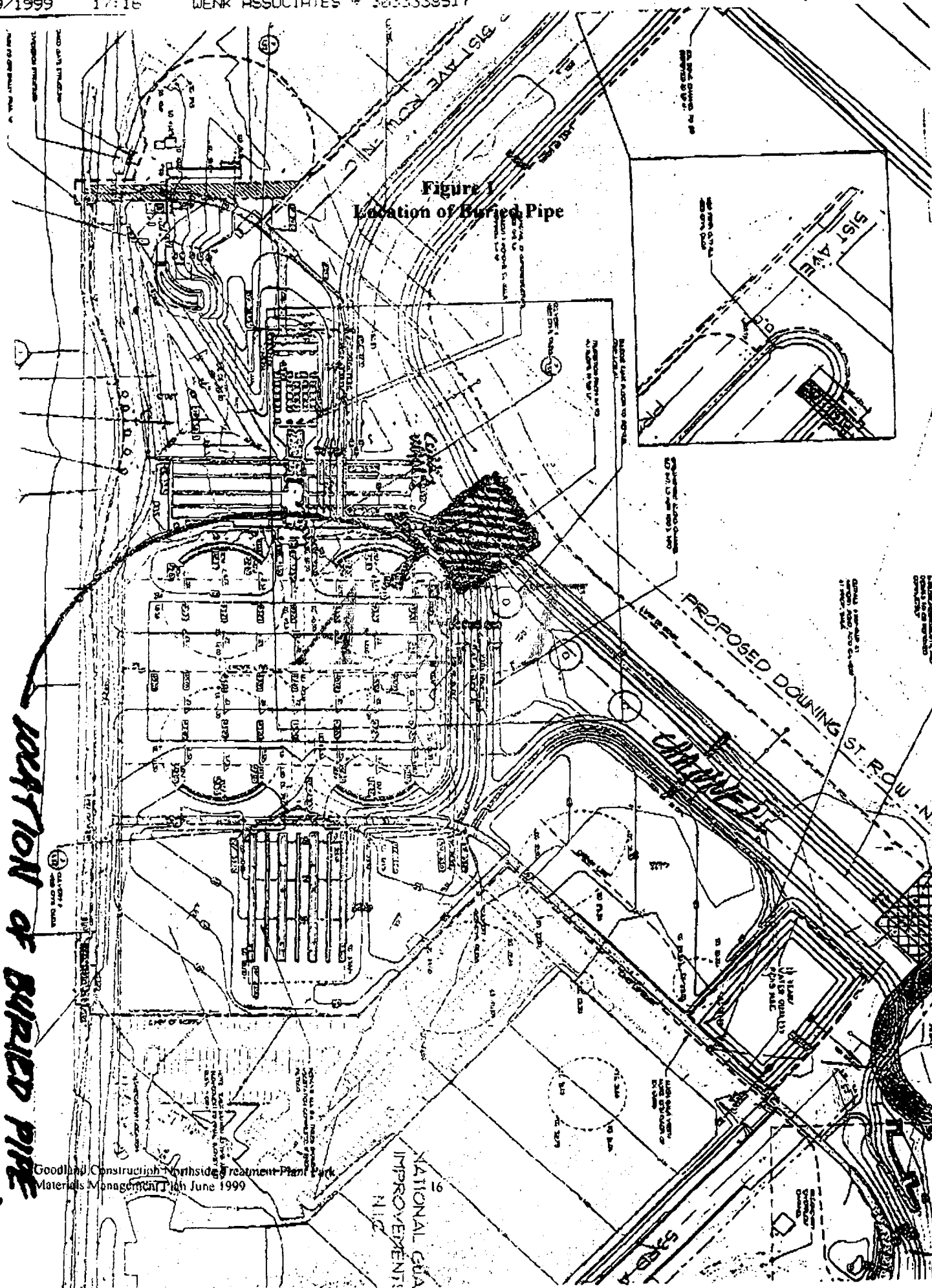
PARAMETER	CONTAINER	SAMPLE PRESERVATION	HOLDING TIME
VOLATILE ORGANICS	TWO 400 ml. Glass VOA Vials NO HEADSPACE STORE INVERTED	2 drops 1:1 HCl per vial ICE TO 4 C	ANALYZE In 7 Days
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	1-Liter Amber Glass Bottle	1: 1 HCl TO pH < 2 ICE TO 4 C	ANALYZE In 28 Days
ACID/BASE/ NEUTRAL EXTRACTABLES	Four 1-Liter Amber Glass Bottles	Ice TO 4 C	EXTRACT In 7 Days ANALYZE In 40 Days
TOTAL RECOVERABLE METALS	1-Liter High Density Polyethylene Bottle	1: 1 HNO ₃ TO pH < 2 Ice to 4 C	13 Days (Hg) Others 6 Mos.
ANIONS	2-Liter High Density PE Bottles	One Bottle: Ice to 4 C one Bottle: 1: 1 H ₂ SO ₄ Ice to 4 C, TO pH < 2 (*)	28 Days
TOTAL DISSOLVED SOLIDS	1-Liter High Density PE Bottle	Ice to 4 C,	7 Days
ALKALINITY	1-Liter High Density PE Bottle	Ice to 40 C	14 Days
RADIOACTIVITY	1-Liter Glass Jar or Two Glass VOA Vials (Tank)	Ice to 40 C	None Specified

*One bottle is preserved for Nitrate/Nitrite and Phosphorous and one bottle is preserved for Chloride, Fluoride and Sulfate.
All Containers must have Teflon-lined lids.

Table 5
Identification of Materials by Flagging

Material	Identification
Soils With Metals - Not Yet Tested for Total Metals	White Flags
Soils With Metals - Tested and Suitable for Restricted On-Site Use Under Fill	Blue Flags
Soils With Metals - Not Yet Tested for TCLP Metals	Orange Flags
Soils With Metals - Non-Hazardous for Off-Site Disposal at Industrial Landfill	Yellow Flags
Soils With Metals - Hazardous for Off-Site Disposal at Subtitle C TSDF	Red Flags
Soils With Hydrocarbons - Not Yet Tested for TPH	Black Flags
Soils With Hydrocarbons - Tested and Suitable for Restricted On-Site Use Under Fill	Blue Flags
Soils With Hydrocarbons - Tested and Suitable for Restricted On-Site Use Under Sealed Surface Only	Adjacent Yellow and Red Flags
Soils With Hydrocarbons - Tested and > 500 ppm TPH for Off-Site Disposal at Industrial Landfill	Yellow Flags
Other Undetermined Wastes Not Yet Tested	To Be Determined

Figure 1
Location of Buried Pipe



Goodland Construction Northside Treatment Plant Park
Materials Management 11th June 1999

NATIONAL GOLF
IMPROVEMENTS
16

NORTH SIDE PARK

LOCATION OF BURIED PIPE

6/10/99
W. H. K. S. C.



CHAIN OF CUSTODY RECORD

COMPANY NAME _____ CONTACT NAME: _____ TELEPHONE NO. _____

[illegible]


COMMENTS: _____

Relinquished by: (Signature)			Received by: (Signature)		Date	Time
Relinquished by: (Signature)			Received by: (Signature)		Date	Time
Dispatched by: (Signature)	Date	Time	Received for Laboratory by:		Date	Time
Method of Shipment:						

Goodland Construction Northside Treatment Plant Park

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ACCEPTANCE PAGE**for****MATERIALS MANAGEMENT PLAN****PROJECT NO. 98-065****NORTHSIDE TREATMENT PLANT PARK****Denver, Colorado****June 1999****Review and Accepted by:****Goodland Construction:**

NameDate**City and County of Denver**

NameDate

**Amendment: Materials Management
Plan for Management of Soil During
Phase III Construction, I-70
Modifications, Brighton Boulevard to
Humboldt Avenue (CDOT Project No.
IR-IM(CX)070-4(145).**

WALSH Project Number: 3027-010
May 6, 1999



Environmental Scientists and Engineers, Inc.

ADMINISTRATIVE RECORD

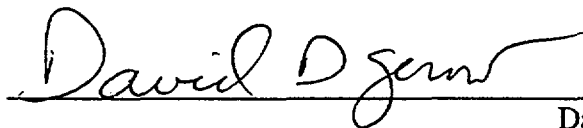
Established 1979

**Amendment: Materials Management Plan for Management of
Soil During Phase III Construction, I-70 Modifications,
Foothill Boulevard to Humboldt Avenue (CDOT Project No.
IR-IM(CX)070-4(145).**

May 6, 1999

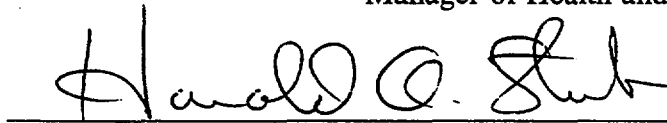
Prepared for: Mr. Steve Sherman
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Dave Gerow, CIH, CSP
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WALSH Project Number: 3027-010

TABLE OF CONTENTS

Introduction and Purpose	1
Description of Proposed Construction Activities Affecting Residential Soils	1
Arsenic in Residential Soils in the Construction Area	2
Lead Concentrations in Residential Soils in the Construction Area	3
Management of Soils to Limit Arsenic and Lead Exposure	4
Capping of Surface Soils with Recycled Asphalt Rotomillings	4
Management of Excavated Soils	5
Dust Control	5
Sediment Control	6
Monitoring by a Qualified Environmental Specialist	6
References	8

Amendment: Materials Management Plan for Management of Soil During Phase III Construction, I- 70 Modifications, Brighton Boulevard to Humboldt Avenue (CDOT Project No. IR-IM(CX)070-4(145).

Introduction and Purpose

This document is an amendment to the Materials Management Plan, Phase II and III Construction, I-70 Modifications Humboldt/44th Streets to Brighton Boulevard (MMP, WALSH, July 24, 1998). This amendment was prepared at the request of the Colorado Department of Transportation (CDOT). CDOT is seeking to appropriately respond to the recently reported findings of elevated arsenic and lead concentrations in near-surface soils in the proposed construction site. Arsenic and lead data have been reported by the U.S. Environmental Protection Agency (EPA, see U.S. EPA, March 1998, U.S. EPA, July 6, U.S. EPA July 20, 1998 and U.S. EPA, September 21, 1998) and Colorado Department of Public Health and Environment (CDPHE, see CDPHE, 1998).

This amendment outlines actions to be followed and objectives to be achieved by CDOT's contractors during all of Phase III construction activities on this project. The actions are intended to protect workers and the public from excess exposure to arsenic and lead from potential soils disturbed during construction. Construction is scheduled to begin in the fall of 2002 with demolition of houses and commercial structures, and final phases of construction in the area will be completed in 2003.

Figure and Table numbers in this amendment refer to figures and tables in the Phase II and III MMP (WALSH, July 24, 1998). Two terms are used in this MMP amendment as CDOT uses them. "*CDOT's construction contractor*" and "*Contractor*" refer to the construction company contracted by CDOT to complete the construction. "*Environmental specialist (ES)*" refers to the qualified environmental firm or individuals employed by the construction contractor to monitor site activities and ensure the environmental requirements and material management plan are fully complied with during construction.

Description of Proposed Construction Activities Affecting Residential Soils

Proposed Phase III construction is described in the MMP for Phase II and III Construction (WALSH, July 24, 1998). CDOT will construct a new roadway connecting a widened Brighton Boulevard to 44th Street, passing under the elevated portion of I-70 (See Figure 2, WALSH July 24, 1998). This roadway will be at approximately the existing grades of

Brighton Boulevard and 44th Street, and is called "relocated 46th Street by CDOT. CDOT will also construct a new ramp from Brighton Boulevard to westbound I-70. This ramp will rise from approximately the current grade of Brighton Boulevard to the elevated portion of I-70. It will be constructed on fill material.

To complete this construction, certain residences and commercial structures north of I-70 between Humboldt Street and Brighton Boulevard and south of 47th Avenue will be demolished and removed. These include properties numbered 38, 41, 43, 54-59, 69-75, 79-83, 85-90, and 93-99 (See Figure 2, MMP, WALSH, July 24, 1998, and WALSH, 1996). Non-residential structures to be demolished include structures at the Denver Fire Station No. 9 (Property 79), Darko's Automotive (Property 43), Lambert Auto Parts (Property 54), Lambert Automobile Electronics (Properties 55 and 56) and others.

Foundations, footings, concrete slabs and basements will also be demolished and removed. Existing sidewalks, driveways and roadways will be demolished and removed. Existing underground utilities in roadways will be excavated and removed or filled in place. New storm and sanitary sewer lines will be installed in the new roadway (relocated 46th Street, See Figure 2). Other excavations may be required for utility installation in relocated 46th Street.

It is anticipated that demolition of structures will begin and be completed in the fall of 1999. The remaining area between relocated 46th Street and I-70 will be sold by CDOT when all construction is completed. Completion of the final phase of construction is scheduled for the fall of 2003, and the most likely use of the remaining property between relocated 46th Street and I-70 is for parking for the Denver Coliseum and/or National Western Stock Show facilities.

3 Arsenic in Residential Soils in the Construction Area

WALSH has reviewed data obtained by the EPA (EPA July 6, 1998 and September 21, 1998) and the CDPHE (CDPHE, 1998) in the proposed construction area. The data are presented in Table 16. EPA measured arsenic and lead concentrations in 48 soil samples collected from the yards around 11 residences that will be demolished for roadway construction. Arsenic and lead were previously determined by CDPHE in two soil samples collected at two of the residences later sampled by the EPA (CDPHE, 1998).

At 9 of the 11 sampled residences arsenic was reported at concentrations below the reporting limit of the primary analytical method in all samples, or was confirmed by an independent laboratory analysis to be below an action level of 70 mg/kg for arsenic in residential soils. These locations are:

4611 Baldwin Court	4645 Baldwin Court	4619 Franklin Street
4615 Baldwin Court	4655 Baldwin Court	4639 Franklin Street
4639 Baldwin Court	4638 Franklin Street	4631 Franklin Street

In one soil sample at 4632 Franklin Street (Property 81) arsenic was confirmed to be moderately above the action level of 70 mg/kg at 82 mg/kg. Arsenic concentrations in other soil samples at these locations were below the reporting limit of the method used.

At one location, 4610 Franklin Street, four soil samples contained arsenic concentrations ranging from 250 to 1,100 mg/kg. Arsenic concentrations were reported to be below the reporting limit of the method used in 8 other soil samples collected at this residence.

There is not enough data to determine the probability of encountering arsenic concentrations above 70 mg/kg in soils at the different sampling depths, 0-4", 6-10", and 12-16".

4 Lead Concentrations in Residential Soils in the Construction Area

WALSH has reviewed data obtained by the EPA (EPA July 6, 1998 and September 21, 1998) and the CDPHE (CDPHE, 1998) in the proposed construction area. Lead concentrations in soils are presented in Table 16.

There are 9 residences that will be demolished for Phase III construction where lead was reported in excess of 500 mg/kg:

4611 Baldwin Court	4631 Franklin Street
4615 Baldwin Court	4632 Franklin Street
4645 Baldwin Court	4638 Franklin Street
4610 Franklin Street	4639 Franklin Street
4619 Franklin Street	

Lead exceeded the 500 mg/kg action level in soils collected from 0-4 inch, 6-10 inch, and 12-16 inch depths. The data presented in Table 17 shows that there is no indication that soils at 0-4 inch depths are more likely to exceed 500 mg/kg than soils at depths down to 12-16 inches.

Table 17. Soil samples where lead concentrations exceed 500 mg/kg at residences to be demolished for Phase III construction.

Depth inches	Interval	Number of Samples	Number Samples 500mg/kg	of >	Percent Samples mg/kg	of > 500
0-4		32	17		53	
4-8		1	1		100	
6-10		11	5		45	
12-16		2	1		50	

5 Management of Soils to Limit Arsenic and Lead Exposure

It is CDOT's objective to protect workers and the public from exposure to arsenic and lead in soils impacted during its construction project. There is no clear pattern in the distribution of elevated lead and arsenic concentrations in near-surface soils in the construction area, and the source or sources of the contamination is not known. It is CDOT's intent to manage soils in the construction area with the assumption that any of the soil at the site may potentially contain elevated levels of lead and arsenic. This management approach provides the highest level of protection of worker and public health. It provides protection from exposure of workers to possible elevated concentrations of metals from all possibly contaminated residential soils, and from soils at commercial or roadway locations that were not sampled by EPA or CDPHE.

In order to minimize worker exposures to lead and arsenic during the construction project, and to protect the health of residents living near the construction project, CDOT will implement the following measures:

5.1 Capping of Surface Soils with Recycled Asphalt Rotomillings

The objective of capping is to limit exposure to lead and arsenic in dust that may be created from contaminated surface soils during construction activity. After demolition of a residential or commercial structure, or removal of sidewalk, roadway or other paved area, or excavation for utility removal or installation, any excavations will be backfilled, and surface soils will be graded to fill depressions. Dust control practices will be implemented in the interim between exposure of surface soils and capping. Capping of surface soils will be achieved by application of at least 4 inches of recycled asphalt rotomillings. The rotomillings will provide a suitable surface for the intended use of most of the area for construction staging. CDOT is requiring the capping of surface soils with 4 inches of rotomillings in the entire area of the Phase III construction between Brighton Boulevard, I-70, and "relocated 46th Street for the duration of the project.

There is no need to remove native soils prior to capping, except as noted in the Phase II and III MMP which specifies stockpiling and removal of materials associated with the former smelter, and of petroleum contaminated soils or other contaminated soils identified by the ES. The handling and stockpiling of any contaminated soils must be consistent with the requirements of CDOT's Standard Special Provision 250 (Environmental, Health and Safety Management).

Excavations may be required within the capped area for utility installation or removal. Any excavations in the capped area will be backfilled and compacted to a depth of 4 inches below grade and then re-capped with at least 4 inches of rotomillings. If capped areas must be re-graded for any reason, the final surface must be covered with at least 4 inches of rotomillings.

5.2 Management of Excavated Soils

Soils excavated during the project may be used for fill in foundation voids remaining after demolition of structures. Soils may also be placed in areas of the project requiring fill if the soils meet the project's minimum specified R-value (a measure of its supportive capacity). Areas requiring fill include the ramps from Brighton Boulevard to the elevated portion of I-70 and the portion of I-70 that will be filled to replace the current viaduct. Soils that must be stockpiled before they may be placed in these areas due to project scheduling will be adequately covered with clean fill material to prevent the dispersion of the lead and arsenic containing dusts. Clean material must meet the requirements of CDOT's Standard Special Provision 106 (Contractor Source Material).

The handling of excavated soils will be consistent with CDOT's Standard Special Provision 250 (Environmental, Health and Safety Management) Section 250.05 (Material Handling).

Soils excavated from the project area during utility removal or installation will either be backfilled into the excavation and capped with 4 inches of rotomillings, or be placed in an area of the project that requires fill material, if the soil meets the project's R-value specification. Any soils stockpiled or placed in areas requiring fill must be adequately covered with clean material (per CDOT's Standard Special Provision 106) to prevent fugitive dust.

5.3 Dust Control

In order to prevent the spread of lead or arsenic containing dusts during construction activities, a comprehensive dust control plan will be designed and strictly enforced by the construction contractor's environmental specialist. The dust control plan will be developed by CDOT and the construction contractor and will specify dust control methods and equipment that will be used to minimize the dispersion of dusts from the site during demolition of structures, and during the excavation, loading, and transportation of contaminated materials. Five copies of the dust control plan will be submitted by the contractor prior to construction so that it may be concurrently reviewed by CDOT, CDPHE, and EPA.

The dust control plan will specify the frequency and duration of dust suppression applications. Dust suppression techniques that may be implemented as a part of the dust control plan include: watering of surface soils, the use of other dust palliatives for dust control, covering construction roads with asphalt or rock to keep dust to a minimum, or vegetating clean cover material on unused areas. The plan will also specify airborne dust concentrations that should not be exceeded before additional dust control methods will be implemented. This plan will also apply to dust control for surfaces capped with clean material.

The effectiveness of dust control shall be evaluated by real time dust monitoring. The air monitoring program should measure airborne particulate matter less than 10 microns (PM-10), and should measure arsenic and lead concentrations in the particulates. The EPA (U.S. EPA, April 16, 1999) has recommended that the dust control program should be designed to ensure

compliance with the following air quality standards and guidelines at representative locations surrounding active work areas:

Table 18. Air Quality Standards and Guidelines Recommended by U.S. EPA for Dust Monitoring During Phase III Construction.

POLLUTANT	AVERAGING TIME	AIR QUALITY STANDARD	REFERENCE
PM-10	Annual arithmetic mean	50 $\mu\text{g}/\text{m}^3$	National Ambient Air Quality Standard (40CFR 50.6)
PM-10	24 hour average	150 $\mu\text{g}/\text{m}^3$	National Ambient Air Quality Standard (40CFR 50.6)
Lead	Maximum arithmetic mean averaged over a calendar quarter	1.5 $\mu\text{g}/\text{m}^3$	National Ambient Air Quality Standard (40CFR 50.12)
Arsenic	24 hour average	333 ng/m (screening level)	OSHA Permissible Exposure Limit divided by a safety factor of 30

5.4 Sediment Control

In order to prevent the dispersion of contaminated or uncontaminated sediments from flowing off site during rain events, CDOT and the construction contractor will implement a program of sediment control during all phases of the Phase III construction project. This program will fulfill the requirements of CDOT's Standard Special Provision, Section 208 (Erosion Control). The program will include procedures and equipment that will be used to protect surface soils from erosion and to protect inlets to storm sewers and surface waters from the infiltration of water borne sediments from the project area. The program and equipment will be monitored closely by the project environmental specialist to ensure effective implementation of the specified procedures.

5.5 Monitoring by a Qualified Environmental Specialist

The construction contractor will employ a qualified environmental specialist to monitor site construction activities. The contractor's environmental specialist will ensure that all provisions of this materials management plan are followed. In accordance with the dust control plan, the environmental specialist will utilize visual observations and suitable real-time dust monitoring devices to assure that excessive dust is not generated by site activities. Action levels and monitoring techniques for dust that are sufficiently protective of worker safety and the public will be specified in the dust control plan, which will be reviewed and approved by CDOT prior to construction.

In order to address potential concerns of the nearby residents and the public about possible air quality impacts from the construction activities, the environmental specialist will be prepared to direct those who visit or make inquiries at the project site to appropriate contacts at CDOT, CDPHE and EPA. The environmental specialist will carry a list of telephone numbers of CDOT, CDPHE, and EPA representatives who are familiar with the project and can discuss the issues with the public. The list of contacts and telephone numbers will be supplied by CDOT prior to construction.

6 References

- CDPHE, 1998. XRF and ICP Analytical Data for 25 Soil Samples Collected in the Elyria and Swansea Neighborhoods. (Rec'd. January 5, 1998).
- U.S. EPA, March 1998. Sampling and Analysis Plan, North Denver Residential Soils. Prepared by URS Operating Services under Contract No. 68-W5-031.
- U.S. EPA, July 6, 1998. Sampling Analysis Report for Removal Site Assessment, North Denver Residential Soils, Denver, Colorado. Prepared by URS Operating Services under Contract No. 68-W5-031.
- U.S. EPA, July 20, 1998. Addendum to Final Sampling and Analysis Plan for Removal Site Assessment, Vasquez Boulevard/I-70 Site, Denver Colorado, Letter from URS Operating Services to U.S. EPA..
- U.S. EPA, September 21, 1998. Sampling Analysis Report-Phase II Sampling for Removal Site Assessment, North Denver Residential Soils, Denver, Colorado. Prepared by URS Operating Services under Contract No. 68-W5-031.
- U.S. EPA, April 16, 1999. Review of Materials Management Plan, I-70 Phase II and III Construction, 44th Street to Brighton Boulevard. Letter to Jim Paulmeno of CDOT from Bonnie Lavelle, Remedial Project Manager, U.S. EPA Region 8.